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U.S. WAR DEPARTMENT

TECHNICAL MANUAL

MESS MANAGEMENT

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TECHNICAL MANUAL
No. 10-205

WAR DEPARTMENT,
WASHINGTON, *April 1, 1940.*

MESS MANAGEMENT

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SECTION I

NUTRITION; RATIONS

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1. Mess management.—*a. Definition.*—Mess management is the supervision and control exercised over every phase of the operation of an Army mess. This supervision is a function of command; all commanders of armies, corps, divisions, brigades, regiments, battalions, and companies exercise some supervision over messing. Direct control is exercised by the mess officer who is assisted by the mess sergeant, cooks, and other mess personnel. The mess officer of an organization may be the commander or an officer designated by him.

b. Functions.—(1) Good mess management requires advance planning and timely preparation. This is important. A frequent cause of poor messes is failure to plan. Each company, troop, and battery usually conducts its own mess with the personnel assigned to the or-

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ganization. Under some conditions it may be advantageous to combine two or more units in one general mess. It may be done when the strength of organizations becomes low, in order to effect economy and efficiency in management and operation. The fundamental principles of mess management are the same for all arms and services, but the equipment may vary somewhat because of the different kinds of service certain organizations may be called upon to perform. It is not necessary for a mess officer to be an expert in cooking and nutrition to manage a mess efficiently. But, he must apply fundamental principles and check the operations daily to see that the food is well prepared and served without waste; that left-over foods are used and not thrown away; that mess attendants are free from disease; and that cleanliness and sanitation are observed in all respects.

(2) In addition to planning, mess management also includes supervision of—

(*a*) Preparation of the menu.
(*b*) Procurement and storage of foods.
(*c*) Preparing, cooking, and serving food.
(*d*) Economical and efficient use of rations.
(*e*) Proper use of mess equipment.
(*f*) Sanitation.
(*g*) Mess accounting.

c. Accounting and administration.—In time of war or on mobilization, mess accounting and the administrative work of procuring food (rations) are greatly simplified, especially in the field.

2. Nutrition.—*a. General.*—While all officers are not expected to be experts in the subject of human nutrition, all officers connected with the operation of Army messes should be familiar with the simple fundamental rules which, when followed, will insure the best nutritional results under all conditions of service.

b. Definition.—Nutrition may be defined as the use of food in the body for the following purposes:

(1) To furnish energy.
(2) To build and repair the body.
(3) To keep the body in a state of health.

c. Functions of food.—The foods which furnish energy, build and repair the body, and keep it in a state of health are shown in the following chart:

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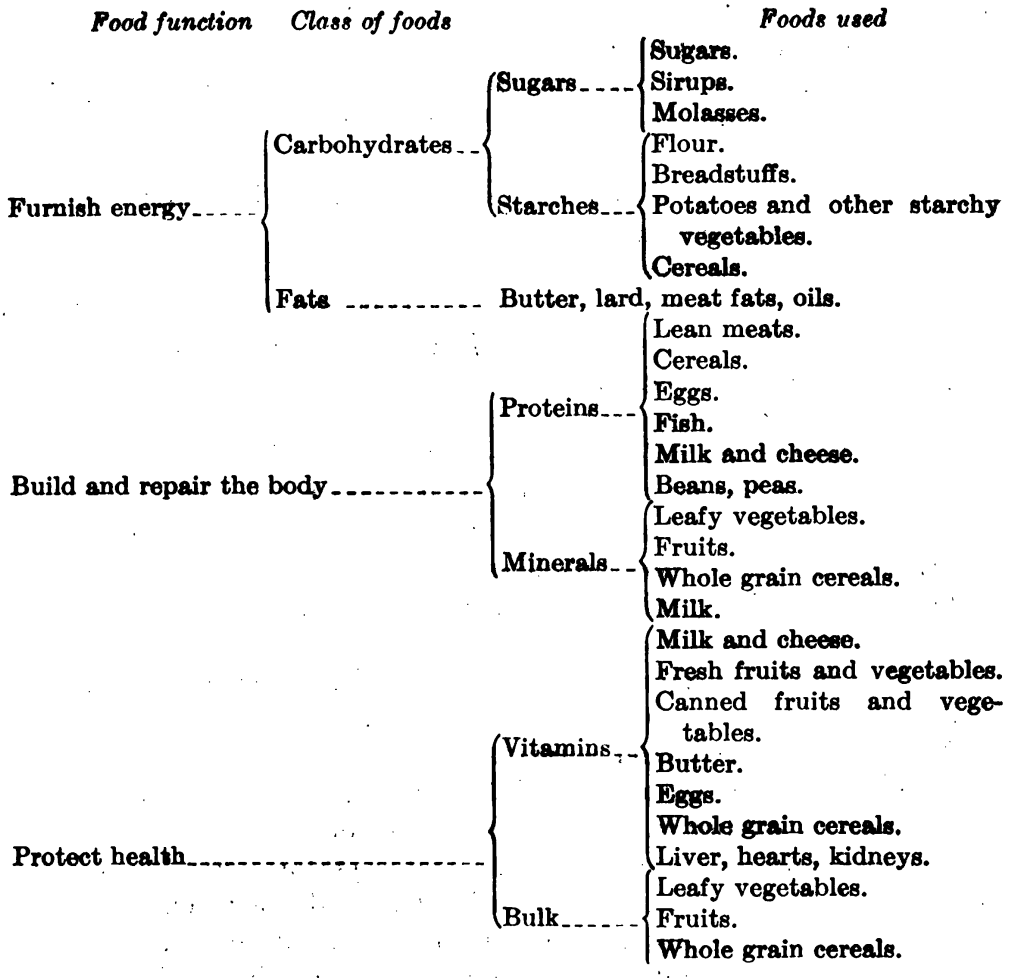
BALANCED DIET CHART



d. Balanced diet.—The body performs its functions best when the purpose foods are consumed in definite ratio to each other, the total amount of each varying according to the type of work being performed. A man at heavy physical work needs more food than a man doing sedentary work but, although he eats more total food, the different purpose foods should remain in correct ratio and the increased consumption of food should be proportioned to the kind of labor actually performed. When all foods required by the body are provided in correct proportion, the diet is said to be balanced. On the other hand, if too much energy food is included in the diet and too little building and repairing food, the diet is not balanced. In the same way the diet is not balanced if it contains sufficient energy and building and repairing food but not enough health-protecting food. A balanced diet may be defined as one that supplied all the food required by the body for all purposes without lack or excess of any one kind.

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Computation of exact quantities of each kind of food required for a certain type of work is beyond the scope of this manual. This problem has been solved for troops in time of war or mobilization, so far as it is possible to solve it, through adoption of the Army field ration, which provides a balanced diet when properly issued, handled, and used.

e. Balanced menu.—From *b*, *c*, and *d* above it is evident that to make a balanced menu it is necessary to—

(1) Include each class of food; that is carbohydrates, proteins, vitamins, fats, minerals, and bulk. However, it is not always possible to do this in every meal or in each day's menu, but any lack of balance should be corrected as soon as possible.

(2) Provide sufficient food.

f. Simple rules for balanced diet.—(1) If the following simple rules are observed in the preparation of menus, the meals served during a day or during a period of several days will be fairly well balanced:

(*a*) Include foods from each class.

(*b*) Have variety; different meats, different vegetables, salads, desserts, etc.

(*c*) See that the vitamin and bulk foods, especially vegetables, fruits, and milk, are served daily if possible.

(2) In deciding whether a menu provides sufficient food, the first point to consider is the nature of the duties performed by the troops being fed. A soldier in combat or at drill or fatigue expends more energy and requires more food than a soldier performing clerical duties at a desk. There is little danger of not enough food being included in the menu of an Army mess under normal conditions. Under some conditions, such as combat, there may be danger of insufficient health-protecting foods being served. Frequently this danger is not due to lack of health-protecting foods in the ration but rather to improper methods of handling and cooking which may partially or completely destroy the health-protecting elements naturally present in some foods.

g. Vitamins.—The health-protecting elements about which experts have the greatest concern in connection with rationing of armies in combat are the vitamins. Ordinarily such troops will receive sufficient vitamins A and B, but may get insufficient vitamin C (the "antiscurvy" vitamin). This is because vitamin C is readily destroyed by ordinary cooking, while vitamins A and B are not. Vitamin C is furnished chiefly by fruits and vegetables, tomatoes in particular being an important source. Canned fruits and vegetables are nearly equal to fresh-gathered fruits and vegetables in vitamin value; indeed, canned fruits and vegetables often are actually superior in this value to fruits

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and vegetables which have been harvested and stored for some time thereby losing part of their vitamin content before being consumed. The Army field ration provides fresh fruits and vegetables when available, and at all times provides liberal allowances of canned fruits and vegetables. Therefore, there is little danger of insufficient vitamin C, provided the vitamin C content is not destroyed by long cooking. Canned fruits and vegetables should be cooked only enough to heat them thoroughly, thus making them more palatable. Boiling heat should not be used. This rule should be rigidly observed.

h. Minerals.—The diet of the average American often is deficient in minerals and bulk. Fruits and vegetables are the most valuable sources of both minerals and bulk. The sirup from canned fruits and the liquid from canned vegetables should never be discarded as they are rich in food value, including minerals. Excess sirup from canned fruits should be added to pies, puddings, salads, etc., and the liquid from canned vegetables may be used in salads, soups, stews, etc.

3. Inspection of foods received by the mess.—While all foods purchased for use by the Army are inspected when received, it must be remembered that foods are subject to deterioration. Canned foods may spoil while in Government storage or in transit to troops. There may be one or more spoiled cans in an unopened case. Mess personnel should carefully inspect all foods received to prevent accepting or serving any foods which have decomposed or are diseased or spoiled in any way. The senses of sight, smell, and taste usually are sufficient to detect any spoiled condition. Spoilage almost always is accompanied by a disagreeable odor, and this odor is of greatest importance in determining the condition of meats and canned foods.

a. Meats.—One test for spoiled meat in the carcass is to thrust a knife blade through the flesh until the point strikes the hip or shoulder joint, withdraw the knife, and smell the point of the blade immediately. Putrefaction usually starts at the joint and produces a foul odor. If the meat is spoiled, the incision made by the knife blade will remain open and the blade is easily withdrawn. In any case of doubt the decision should be made by a qualified inspector.

b. Canned foods.—Spoilage in canned foods usually is indicated by "swelled" (bulged) cans. The bulging may be at one or both ends. The exception to this is in starchy vegetables, such as corn, pumpkin, squash, sweetpotatoes, etc., which often spoil without swelling the can. This type of spoilage is called "flat sours." On opening, a strong, disagreeable odor is noticed. It is never safe to use food from swelled cans.

4. Rations.—*a. Definition.*—A ration is the allowance of food for one person for one day provided by the Government for the subsistence

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of soldiers and other authorized personnel. An officer is not entitled to a ration, but in the field one may be issued to him for which he makes a proper money value deduction on his pay voucher.

b. Method of issue.—A ration may be issued in the form of a money allowance which messes are permitted to use for the purchase of any kind of food. The garrison ration is issued in the form of a money allowance. The sales officer gives each mess a money credit for the money value of the ration. For example, if a company mess has a strength of 100 men on August 1 and the value of the ration for August is $0.30, the sales officer gives the mess a credit for $30. The mess then purchases food from the quartermaster as it desires. If the mess purchases less than $30 worth it is entitled to the saving in cash. This is called the "ration savings" privilege. The cash savings are placed in the company fund and may be spent at any later date for food. For convenience, the accounts are settled by the quartermaster once a month. The ration may be issued in kind; that is, in the form of actual food, whereupon there would be no cash allowance or "ration savings" privilege. The field rations are issued in kind. In time of war or mobilization the "ration savings" privilege is usually suspended, and rations are issued in kind whether troops are in the field, in camp or garrison, or traveling.

c. Kinds.—The Army uses several kinds of rations, each intended for special conditions of service. They are—

(1) Garrison ration.

(2) Field ration, Types A, B, C, and D.

(3) Travel ration.

(4) Certain other rations which are limited to special conditions and need not be discussed here.

d. When issued.—(1) The garrison ration is issued in time of peace to most troops stationed at posts. It is always issued in the form of a money allowance, never in kind.

(2) The field ration is prescribed for use in time of war or national emergency when the garrison ration is not used. It is issued in kind and no "ration savings" are allowed.

(3) The travel ration is issued in kind, both in time of peace and war, to troops who are traveling and are separated from cooking facilities. It is not issued to troops who are traveling by marching. Troops traveling by marching take cooking equipment with them and are issued the field ration.

(4) The ration for National Guard troops in camps of instruction in time of peace is provided by the Federal Government in cash, which is turned over to and administered by National Guard authorities.

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In time of war or emergency mobilization, it receives the same ration as troops of other components of the Army; usually the field ration.

5. Method of supply of rations to troops; accounts.—*a. In the field.*—(1) Field Service Regulations provide for automatic supply of rations, that is, a constant flow of rations from depots to troops with a minimum of administrative work on the part of troops. This scheme is designed to relieve the fighting forces of all anxiety concerning questions of food supply, and automatically to effect a daily delivery. The only action necessary by company commanders to secure rations is to submit strength reports to regimental headquarters (unless the company is serving alone). Any unit operating independently is supplied in the same way as a division. The strength reports submitted by organizations are consolidated by the division adjutant who furnishes copies to the division G–4 and the division quartermaster. Based upon these figures, the division quartermaster sends a daily telegram to the army quartermaster. This information may be transmitted by telephone. The army quartermaster then sends a consolidated daily telegram to the regulating officer, giving the needs of the several divisions and of corps and army troops. The regulating officer calls on the designated depot or depots in the communications zone for shipment of the division's requirements in one of two ways:

(*a*) By directing the supplies to be made up into unit sections at the depot for through shipments to divisions, or

(*b*) By calling for shipment of supplies for the army in bulk. When the latter method is employed, it is necessary to make up the unit sections for each division at the regulating station. In either case the daily shipment for any particular division is routed by the regulating officer to the proper railhead or other supply point.

(2) Upon arrival of the daily train at the railhead, the railhead officer delivers the supplies to the division quartermaster, who utilizes transportation and personnel of the division quartermaster service to distribute the supplies to organizations of the division. Generally, supplies are delivered to bivouacs of the unit trains, but they may be secured at the railhead by the unit trains. The quartermaster vehicles are loaded at the railhead in groups so as to carry the proper amount of supplies for each unit. Administrative orders may designate specific points for distribution to units of the division and prescribe the time each unit will be served. The responsibility of the division quartermaster ceases when the supplies are turned over to unit supply officers.

(3) In order to issue the rations properly, it is necessary that the railhead officer, the division quartermaster, and the regimental supply officer have copies of those regulations which publish the prescribed

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ration. This is published in orders issued either by the War Department or by the commander of the field forces. In order that the company commander may check to see whether the company is receiving its authorized quantity of rations, it is necessary for him to know the composition of the ration. It must be remembered by all company commanders that conditions may arise which will make it impossible or impracticable to get the full allowance to the company. Such situations are at times inevitable circumstances of field service, are easily recognized, and are not just grounds for complaint.

(4) Under normal conditions each infantry division carries two rations distributed as follows:

On kitchen truck and trailer	1 field ration.
On the division quartermaster train	1 field ration, Types B, C, and D.
Total	2 rations.

b. In camp or garrison.—(1) When troops are serving at permanent posts or permanent or semipermanent camps or mobilization points, or at any locality other than in the field, they will be supplied with the garrison ration. The procedure in obtaining and using information pertaining to the messing of an organization is given below:

(*a*) From the data entered each day on the company morning report, the mess sergeant is informed of the number of rations for which he can take monetary credit on his mess reports and records. Then, knowing the money value of the ration (which is computed by the sales officer or quartermaster at the beginning of each month), he can readily compute the money he can spend for any particular day or period. He buys provisions daily or as needed from the quartermaster sales store which will go to make up the various items appearing on the approved menu.

(*b*) At the end of each month the organization commander submits a ration return (which is a certificate showing the total number of rations due the organization for the period) to the commanding officer for approval. When approved the ration returns from all units are sent to the sales officer to be used in making up the "Ration and Savings Account." This record or voucher is used to effect a settlement between the sales store and the organization concerned. If any money is due the Government, the organization concerned will pay the proper amount from its mess funds, and if any credit is due an organization, it will be paid by the disbursing officer.

(2) Mess accounts for an organization are recorded daily on W. D., Q. M. C. Form No. 469 (Monthly Mess Accounts). A uniform

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method of keeping an accurate record of mess accounts on W. D., Q. M. C. Form No. 469, augmented by additional columns 17 to 21, inclusive, is described below. (See form opposite page 14 for entries shown below.)

(*a*) Extension columns should be pasted to the printed form so that alinement is obtained between the printed form and additional columns 17 to 21.

(*b*) Under the heading, "Monthly Mess Account of," should be entered the designation of the organization (Co. C, 501st Inf.). Month and year should be entered (March 1940). "Ration value" as furnished by the quartermaster in this case is $0.45. Allowance from company for month, "None" should be written, unless there is an allowance from the company fund. For the day, "None" should be written, unless there is an allowance. Stock at the end of the previous month *will be the actual value of all* subsistence on hand on the last day of the month as shown by the inventory *taken by the mess officer, assisted by the mess sergeant* ($250.00).

(*c*) Columns 2 to 21 should be computed in the following manner:

Column 2: Under "Today" is shown the number of rations due for the day as recorded in the morning report. Under "To date" the total number of rations due to date is computed as follows: Start with the first day of the month with 200 rations due as shown on the morning report. Under "Today" enter 200 and under "To date" 200. On the second day the morning report shows 195 men; enter 195 under "Today"; add 195 to 200 as shown by the previous day, and place 395 under "To date" for the second day of the month. For the third day the morning report shows 197 men; enter 197 under "Today" and add 197 to 395 as shown for the previous day and place 592 under "To date" for the third day. Continue this process of computation throughout the month.

Column 3: "Total value of ration for the day" is the total number under "Today" multiplied by the value of the ration. The ration value as furnished by the quartermaster, $0.45×200, or $90.00, is the ration value for the day and the entry in column 3 for the first day; 195×$0.45, or $87.75, for the second day; 197×$0.45, or $88.65, for the third day, and so on.

Column 4: Should be left blank unless there is an allowance from the company fund. Normally this will occur during the months of November and December (Thanksgiving and Christmas).

Column 5: This column must be filled in daily. Amounts for this column are taken from the daily boarders' list which should be kept in every company. Regular boarders usually are charged the ration value and transient boarders $0.25 per meal. In this case there are

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10 regular boarders and one transient boarder for one meal on the first day of the month. 10×$0.45 equals $4.50 plus $0.25 or $4.75 to be entered in column 5 for the first day. On the second or third day only the regular boarders are present and the entry should be $4.50 each day.

Column 6: This column is computed by adding the totals of columns 3, 4, and 5. $90.00 in column 3 plus zero in column 4 plus $4.75 in column 5 equals $94.75 to be entered in column 6 for the first day. For the second day add $87.75 plus zero plus $4.50 or $92.25, and for the third day $88.65 plus $4.50 equals $93.15, and so on through the month.

Column 7: "Total credit to date" is obtained as follows: For the first day this entry is the same as that in column 6, $94.75. For the second day add the total credit of the preceding day as shown in column 7 to $92.25, which is the total credit for the second day, and enter the total $187.00 in the column for the second day. For the third day add $93.15 to $187.00 and enter the total $280.15 for the third day, and so on.

Column 8: "Purchases from the commissary." *The total amount of the sales slips furnished by the sales officer should be posted in column 8 the same day they are received.* Under "To date" in column 8 should be shown daily the total amount of purchases from the commissary to date. In this case on the first day of the month sales slips amounting to $100.00 are received from the sales officer. $100.00 is entered under *both* "Today" and "To date." No more entries are made under "Today" until the next subsistence sales slips are received. On the eleventh day of the month subsistence sales slips amounting to $350.00 are received. The sum $350.00 is entered under "Today" for the eleventh and then added to the $100.00 carried "To date" and the total of $450.00 entered under "To date."

Column 9: This column is used in the same way as column 8 recording post exchange purchases.

Column 10: "Purchases from other sources" are for all food products purchased which cannot be shown in columns 8 and 9, such as fresh fruits, vegetables, and other local purchases. This column is computed in exactly the same manner as column 8. The first day, $43.90; second day, $35.00; and the third day, $30.50 in which miscellaneous exceptional articles were purchased. The entry for the third day under "To date" is $109.40.

Column 11: The amounts for this column are obtained by adding together the amounts under "Today" in columns 8, 9, and 10. Totals for the first day are $143.90; second day, $35.00; and third day, $30.50.

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Column 12: "Total purchases to date" are obtained by adding the amounts under "To date" in columns 8, 9, and 10. The figures to be entered are $143.90, $178.90, and $209.40 for the first, second, and third days, respectively.

Column 13: "Savings from the quartermaster for day" is obtained by subtracting the amount under "Today" in column 8 from those in column 3. On the first day the figure under "Today" in column 8 exceeds that in column 3, hence there is no entry in this column for the first day. On the second day there is no entry under "Today" in column 8, therefore there is zero to subtract from the figure in column 3 and the entry in column 13 is $87.75. The same condition exists for the third day and the entry for this day is $88.65.

Column 14: "Deficit due the quartermaster for day" is obtained by subtracting the amount in column 3 from that under "Today" in column 8. This is just the reverse of the method shown for column 13. For the first day the figure in column 3 is $90.00 and subtracting it from the $100.00 in column 8, leaves a balance of $10.00 to be entered in column 14 for the first day. On the second and third days there is nothing under "Today" in column 8, therefore, there can be no entry in column 14 for these dates.

Column 15: "Standing with quartermaster" is column 13 or 14 for the day plus column 15 for previous day. For the first day there is in column 14 a deficit due quartermaster of $10.00. This figure is entered in column 15 as minus $10.00. For the second day there is in column 13 a saving from the quartermaster of $87.75; subtracting the deficit of the previous day there is a balance of $77.75, which is entered in column 15 as plus $77.75. For the third day there is a saving of $88.65 in column 13, which added to the balance of the previous day in column 15 shows the standing with the quartermaster to be plus $166.40. This process is then continued throughout the month.

Column 16: The word "financial" should be written above the word "Standing" in column 16. "Financial standing for mess to date" is obtained by subtracting the amount in column 12 from that in column 7. For the first day subtract $143.90 from $94.75 which leaves a minus balance of $49.15. This is shown in column 16 as minus $49.15. For the second day subtract $178.90 from $187.00, which leaves a balance of plus $8.10. Likewise, for the third day enter plus $70.75.

Column 17: "Value of stock in supply room." For the first day of the month the figure is the same as the value of the stock shown in the upper right corner of the original W. D., Q. M. C. Form No. 469,

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that is, the value of the inventory as of the last day of the previous month, plus the total purchases for the day (column 11). For succeeding days of the month, this column shows for any day the balance of stock on hand for the previous day (found in column 19) plus the total purchases *for the day* (column 11), or, in other words, all the stock on hand after dinner yesterday plus all the stock acquired during today. In this case, first day: Inventory, $250.00, plus column 11, $143.90, equals $393.90. Second day: $303.90 (from column 19 of the preceding day) plus $35.00 from column 11 equals $338.90. Third day: $245.40 plus $30.50 equals $275.90.

Column 18: This column shows the "Cost of meals for each day," obtained from the daily menu, commencing with supper the night before. It is of paramount importance that the menu for the day is figured closely, taking painstaking account of all supplies used in the preparation of the meals each day in order to get as close as possible to the actual cost of the meals. In example, first day; cost of meals from menus, $90.00; second, $93.50; and third, $97.00.

Column 19: This column shows the "Balance of stock on hand" and is found by deducting the amount of stock withdrawn (consumed) from the accountable stock. Column 19 equals column 17 minus column 18. This column is very important because it gives the value of the stock on hand at any time and permits the immediate checking of an inventory, regardless of when it is taken. *When an inventory is taken, the actual value will be entered in column 19 and used as a basis for determining the entry in column 17 of the next day.* The difference between the actual inventory and the estimated inventory should be indicated on the margin of W. D., Q. M. C. Form No. 469. In this case, first day, $393.90 minus $90.00 equals $303.90; second, $338.90 minus $93.50 equals $245.90; third, $275.90 minus $97.00 equals $178.90.

Column 20: This column shows the gain or loss on any given day with relation to the capital stock with which the month was started. Thus it means the relation (for the day) of the figure in column 19 to the value of stock shown at inventory on the last day of the previous month, as recorded in the upper right corner of the original W. D., Q. M. C. Form No. 469. *Therefore, the figure to be placed in column 20 on any day is the difference between the value of stock the last day of the previous month and the balance of stock shown in column 19.* It answers the question: Has the mess more or less stock than it started the month with? In example, first day, $303.90 minus $250.00 equals plus $53.90; second day, $250.00 minus $245.40 equals minus $4.60; third day, $250.00 minus $178.90 equals minus $71.10.

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Column 21: This column shows the "Actual standing of mess" to date for the current month. It shows whether the mess is gaining or losing during the current month only. There is no connection between the standing given in this column and the status of the mess in the preceding month. By watching this column, the organization commander can exercise financial control of his mess. In example, first day, $53.90 (column 20) minus $49.15 (column 16) equals plus $4.75; second day, $8.10 minus $4.60 equals plus $3.50; third day, minus $71.10 subtracted from $70.75 equals minus $0.35. In column 16 for the first day there is shown minus $49.15 and in column 20 there is a plus $53.90. Looking at the figures it is seen that the plus figure exceeds the minus figure and after subtracting we have a plus $4.75 for entry in column 21. (If both figures were minus, they would be added together, making the entry in column 21, minus $103.05.) For the second day, there is a plus $8.10 in column 16 and a minus $4.60 in column 20. In this case, also, the plus figure exceeds the minus figure by $3.50, and the entry in column 21 is plus $3.50. For the third day, there is a plus $70.65 in column 16 and a minus $71.10 in column 20. In this case, the minus figure exceeds the plus figure, and, when subtracted, there is a minus $0.35 for entry in column 21.

(*d*) Note that column 15 shows the standing with the quartermaster for subsistence furnished by him. The amount of the ration savings check or the amount due the quartermaster, as the case may be, is computed in the following manner: The figure under "To date" in column 8 as shown for the last day of the month is subtracted from the total of all entries in column 3. (The figure for the total of column 3 also can be obtained by multiplying the number of "Rations to date" in column 2 as shown for the last day of the month by the value of the ration.) If the total of column 8 exceeds the total ration value for the month, the excess must be paid from ration savings in the company fund.

(*e*) Appropriate entries will be made in all blank spaces, including the signatures of mess sergeant and mess officer on the bottom of W. D., Q. M. C. Form No. 469 after the close of the month's business.

(*f*) On the reverse side of W. D., Q. M. C. Form No. 469 is the subsistence stock record. The figures for column 3 are obtained from the inventory of the preceding month and will show quantities, not money value. In column 4 will be entered the quantity received during the 10-day period. A separate record will be kept of perishables and other items which are received several times during a 10-day

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period, and the total amount received during the period will be entered on the 10th day of the period. Column 5 is for the sum of the quantities shown in columns 3 and 4. The figure in column 6 should be obtained from the total amount used in the menus for the 10-day period, and column 7 "Balance on hand," is for recording the inventory taken at the end of the 10-day period. Any serious discrepancy noted in the amounts used in column 6, as taken from the menus, and that noted in the inventory in column 7, indicates a leak and should be investigated. Column 8 is obtained by multiplying the unit price charged by the quartermaster, by the number of items on hand, as shown by the inventory. All other items will be inventoried at cost price as shown on original invoice. For the next 10-day period the amounts shown in column 7 will be carried forward to column 9 and the same procedure continued as described for the first 10-day period.

(*g*) Orderly files of invoices and sales slips should be maintained and filed with completed W. D., Q. M. C. Form No. 469 as soon as each month's business is ended. Invoices and sales slips should be kept in proper order so that any one day's or several days' entries may be checked without losing time searching for them.

c. Travel ration.—The supply of travel rations is not automatic. Troops departing on a journey present copies of travel orders to the quartermaster designated to supply them, and he issues the necessary number of travel rations. Depending upon circumstances, the travel orders may prescribe that liquid-coffee money be supplied in lieu of the coffee, sugar, and milk components of the ration. In such a case the proper amount of cash is issued by the disbursing officer on presentation of travel orders. Travel rations and liquid-coffee money are drawn by the commander of the troops traveling, or his accredited representative, who may be a subordinate officer. Frequently troops travel without commissioned officers. In such cases the senior enlisted man draws the travel rations, and liquid-coffee money is paid to each individual concerned.

6. Field ration.—*a. Composition.*—(1) The components and substitutes of the field ration will be prescribed by the War Department or the commander of the field forces and will correspond as nearly as practicable with the components of the garrison ration. The following table of food equivalents of component articles of the garrison ration is used for establishing the field ration, Type B:

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STOCK RECORD

		10th Day						20th Day						Last Day					
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	Unit	Bal. For'd	Rec'd	Total Acc't (3+4)	Used	Bal. on Hand (5−6)	Value of 7	Bal. For'd	Rec'd	Total Acc't (9+0)	Used	Bal. on Hand (11−12)	Value of 13	Bal. For'd	Rec'd	Total Acc't (15−16)	Used	Bal. on Hand (17−18)	Value of 19
	Lbs.																		
	Cans																		
	Lbs.																		
	Lbs.																		
	Cans.																		
	Lbs.																		
	Cans																		
	Lbs.																		
	Cans																		
	Lbs.																		
	Lbs.																		
	Lbs.																		
	Pkgs.																		
	Cans.																		
	Cans.																		
	Cans.																		
	Lbs.																		
	Cans.																		
	Pkgs.																		
	Lbs.																		
	Pkgs.																		

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Component articles of garrison ration	Quantities	Substitutive articles for field ration	Quantities
	Ounce		*Ounce*
Beef, fresh or frozen	10	Lamb, fresh or frozen	10
		Mutton, fresh or frozen	10
		Veal, fresh or frozen	10
		Reindeer meat, fresh or frozen	10
		Beef hearts, fresh or frozen	10
		Liver, beef, fresh or frozen	10
		Beef, corned, canned	8
		Pork, fresh or frozen	10
		Bacon	6
		Fish, fresh or frozen	10
		Fish, canned	8
		Hash, corned beef, canned	10
		Turkey, dressed, undrawn	16
		Fowl, undrawn, fresh or frozen	16
		Ham, smoked	9
		Shoulders, picnic, smoked	10
		Sausage, fresh or frozen	8
		Sausage, canned	8
Bacon	2	Beef, fresh or frozen	4
		Pork, fresh or frozen	3
		Fish, pickled (mackerel)	4
		Ham, smoked	3
		Beef, corned, canned	3
		Hash, corned beef, canned	4
		Sausage, canned	3
		Pork, salt	3
		Turkey, dressed, undrawn	6
Chicken, undrawn, fresh or frozen.	2	Turkey, undrawn, fresh or frozen.	2
		Ducks, undrawn, fresh or frozen.	2
		Geese, undrawn, fresh or frozen.	2
		Fowl, undrawn, fresh or frozen	2
		Beef, fresh or frozen	2
		Pork, fresh or frozen	2
Pork, fresh or frozen	4	Beef, fresh or frozen	6
		Bacon	2
		Ham, smoked	3
		Sausage, pork, canned	3
		Sausage, pork, fresh	3
		Pork, salt	3
		Pork, pickled	4
		Turkey, dressed, undrawn	4
	Each		*Each*
Eggs, fresh	1	Eggs, storage	1
			Ounce
		Eggs, whole, dried	.5
	Ounce	Eggs, whole, frozen	1
Beans, dry (any kind)	.5	Beans, baked, canned	1.5
		Cereals, prepared	1
		Peas, dried	.5
		Hominy, lye, canned	2
		Hominy grits	.5
		Cereals, uncooked	.5
		Rice	.6

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Component articles of garrison ration	Quantities	Substitutive articles for field ration	Quantities
	Ounce		*Ounce*
Rice	.6	Corn meal	1
		Beans, dry	.5
		Peas, dried	.5
		Hominy, lye, canned	2
		Hominy grits	.5
		Cereals, prepared	1
Rolled oats	1.5	Cereals, uncooked	1.5
		Cereals, prepared	1
		Rice	1
		Corn meal	1
		Hominy grits	1.5
Beans, string, canned	3	Spinach, canned	3
		Beans, string, fresh	6
		Beans, lima, canned	3
		Dehydrated vegetables	.6
		Other canned vegetables	3
		Cabbage, canned	3
Corn, canned	2	Beets, canned	3
		Dehydrated vegetables	.4
		Carrots, canned	3
		Potatoes, fresh	6
Onions	2	Dehydrated onions	.4
		Onions, green	4
Peas, canned	2	Beans, string, canned	2
		Beans, lima, canned	2
		Beans, chili, canned	2
		Peas, fresh	6
		Other canned vegetables	2
		Dehydrated vegetables	.4
Potatoes, fresh	10	Dehydrated potatoes	2
		Potatoes, canned	10
		Potatoes, sweet, canned	6
		Other canned vegetables	10
		Tomatoes, canned	14
Tomatoes, canned	2	Tomato juice, canned	2
		Sauerkraut, canned	2
		Tomatoes, fresh	4
		Fruit juice	2
Apples, canned	1.5	Apples, evaporated	.5
		Apples, fresh	4
		Apple butter	2
		Canned fruits	1.5
		Dried fruits	.5
Jam or preserves	.5	Jelly	.5
		Marmalade	.5
		Fresh fruit	2
Peaches, canned	1.2	Peaches, evaporated	.4
		Apricots, evaporated	.4
		Peaches, fresh	2.4
		Other canned fruits	1.2
Pineapple, canned	1.2	Other canned fruits	1.2
		Fresh fruit	3
Prunes, canned	.3	Prunes, evaporated	.1
		Other evaporated fruit	.1
		Other canned fruit	.3
		Raisins	.1
		Currants	.1

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Component articles of garrison ration	Quantities	Substitutive articles for field ration	Quantities
	Ounces		*Ounces*
Coffee, roasted and ground	2	Coffee, soluble	.6
		Chocolate, plain	1
		Cocoa	3
		Tea	1
		Other beverages	2
Cocoa	.3	Cocoa preparations	.5
		Coffee	1
		Coffee, soluble	.1
		Tea	.2
		Other beverages	1
Tea	.05	Coffee	.1
Milk, evaporated	1	Milk, whole, dry	.25
		Milk, skimmed, dry	.5
		Milk, condensed	1.5
		Milk, fresh	2
Milk, fresh	8	Milk, whole, dry	1
		Milk, skimmed, dry	2
		Milk, evaporated	4
		Tomato juice	8
		Fruit juice	5
Lard	.64	Oil, cooking	.64
		Lard substitute	.64
Lard substitute	.64	Lard	.64
		Oil, cooking	.64
Butter	2	Peanut butter	3
		Fruit butters	3
		Jams	2
		Jellies	2
Flour, wheat	12	Flour, graham or rye	12
		Bread, fresh	12
		Bread, hard	8
		Corn meal	12
		Crackers	8
Baking powder	.09	Yeast, compressed or dried	.08
		Soda, baking	.09
Macaroni	.25	Spaghetti	.25
		Tapioca	.25
		Cornstarch	.25
		Spaghetti, prepared, canned	1
Cheese	.25	Flavorings, food	.25
		Butter	.2
		Peanut butter	.25
Sugar	5		
Cinnamon	.014	Allspice	.014
		Cloves	.014
		Mace	.014
		Nutmeg	.014
Flavoring extract	.02		
Pepper, black	.04	Pepper, cayenne or white	.04
		Paprika	.04
Pickles, cucumber	.16	Other pickles (all kinds)	.16
Salt	.5		
Sirup	.5	Honey, strained	.5
		Jam or preserve	.4
Vinegar	.16	Pickles (all kinds)	.16

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(2) In the theater of operations, when these articles cannot be obtained otherwise by the troops, the commander of the field forces may authorize the issue of any of the following items as a part of the field ration, not to exceed the allowances per ration as shown:

Articles	Quantities	Substitutive articles	Quantities
	Ounce		*Ounce*
Candy	1		
Tobacco, smoking	1	Tobacco, chewing	1
			Each
		Cigarettes	20
	Each		
Papers, cigarette, to each 2 ounces of smoking tobacco allowed.	100		
	Box		
Matches, safety, for each issue of smoking tobacco or cigarettes.	.5		

b. Daily issues.—It will be noted that the field ration may consist of a number of component and a number of substitutive articles. Supply officers at depots are permitted to use their own judgment in selecting articles of food from the component and substitutive lists when making shipments. Field rations arriving at railheads will vary in composition owing to availability of components and the use of substitutive articles to secure variety. For example, on one day the ration might include the full component allowance of fresh potatoes; on the next day it might include no fresh potatoes but in lieu of potatoes include the substitutive allowance of canned potatoes or a combination consisting of part of the substitutive allowance of canned potatoes and a part of the substitutive allowance of other canned vegetables. Fluctuations in strength might necessitate adjustments by the railhead officer which would further vary the composition of field rations when issued to the troops. Consequently company commanders and mess officers do not know in advance exactly what articles of food will be included in the daily issues of rations. The more staple articles, such as bread, potatoes, meats, canned tomatoes, coffee, sugar, milk, sirup, and spices, usually arrive at a fairly uniform rate. It is obvious that the daily menu in the company mess must conform to the ration which actually is received. This necessitates ingenuity in effecting food combinations. For example, the issue for one day might include canned tomatoes, canned peas, and canned green beans, but none in quantities sufficient

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to serve as a separate dish. However, they can be combined with meat to make a stew, or the tomatoes and peas combined with macaroni and a little ground meat, etc. Many such combinations are possible.

7. Travel ration.—*a. Composition.*

Article	Quantity	Article	Quantity
	Ounce		*Ounce*
Bread, soft	18	Jam	1. 4
or		Coffee, roasted and ground	2
Bread, hard	16	Sugar	4
Beef, corned, or hash, corned beef	12	Milk, evaporated, unsweetened	1
Beans, baked	4		
Tomatoes, canned	8		

NOTE.—When liquid-coffee money is provided it is in lieu of the coffee, sugar, and milk components of the travel ration.

8. Handling rations.—*a. Field rations.*—(1) *Daily use.*—Whenever troops are in the field, a daily issue of rations to be consumed daily is contemplated. This is chiefly because the issue of more than one day's ration would overload organic transportation, especially if the troops are on the march. To make this system work well requires loyal and intelligent cooperation by all concerned. A certain amount of "overlap" in the case of a few items is unavoidable. For example, the daily allowance of macaroni is insufficient to provide a separate dish; therefore, unless the macaroni is combined with some other food, it is necessary to save the daily issues until sufficient is accumulated. Consumption of spices and flavoring extracts, etc., fluctuates. Any carry-over of such articles is so small in bulk and weight that it can be accommodated in the transportation of the organization.

(2) *Distribution.*—(*a*) The regimental or unit supply officer has a difficult task in the daily distribution of the field rations he receives from the quartermaster. This is so for a number of unavoidable reasons. Frequently it is impossible to issue to a company the exact allowance due without breaking original packages. Conditions of weather, available shelter, enemy fire, etc., might make it extremely difficult to break packages and issue odd weights of such foods as sugar, coffee, flour, spices, etc. Therefore, the best system often is to issue unbroken packages and keep a debit and credit record, overages and shortages to be adjusted as soon as possible. This probably was the expedient most frequently adopted by regimental

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supply officers during the World War. It is an expedient which should be, and probably would be, adopted by railhead officers in making their issues. The total allowance for a division or similar unit in the case of several articles of the field ration seldom results in an even number of original containers. The usual practice is to issue more than the allowance in order to avoid breaking containers at the railhead. If a division were entitled to 20 and a fraction cans of pepper, the railhead probably would issue 21 cans, make a record of the overage, and adjust this overage on succeeding issues. It is impossible to prescribe regulations for distribution of rations in the field which will cover every possible contingency which may arise. Many regimental or unit supply officers become, in effect, regimental mess officers in that they ascertain daily the needs of each mess and adjust issues accordingly. One company mess may be short sugar and have an ample supply of coffee, while another company mess may be short coffee and have ample sugar. Company messes should cooperate with the regimental or unit supply officer by saving empty packing cases, cans, etc., which will serve as containers to transport rations.

(*b*) When troops are serving at posts, camps, or in permanent or semipermanent locations, issue and handling of field rations are accomplished in a manner somewhat different than that which prevails in the field. At such locations, sufficient field rations for a week or 10 days probably would be issued at one time. When this occurs, company commanders must remember that the rations issued are the total allowance for that ration period; when they are gone, no more will be issued until the expiration of the period; therefore, control must be exercised to see that consumption is intelligently spread over the entire period. Inexperienced mess personnel are prone to the error of feeding heavily the first few days, with the result that the men are on short rations for the remainder of the ration period.

b. Travel ration.—The travel ration, being intended for troops traveling without cooking facilities, consists of foods which can be eaten without cooking. The exception to this is coffee which, together with sugar and milk, is issued when it appears probable that the troops can obtain hot water and utensils for making the beverage en route. Control is essential to insure equitable distribution of travel rations at a proper daily rate.

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SECTION II

COOKING

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9. General principles.—Cooking renders foods more palatable and digestible and kills any germs which might be present. In cooking, the most important factors are proper cooking time, temperature, and good seasoning. Temperatures and time of cooking which are correct for one food might quickly ruin other foods. Seasoning should, in general, be done while the food is cooking. The only accurate way to determine whether food is properly seasoned is to taste it. Cooking of foods should not be completed until just a few minutes before serving.

10. Meats.—*a. Beef.*—(1) A beef carcass contains two types of meat—tender and less tender.

(*a*) The tender cuts are—

1. In the forequarter, the rib.

2. In the hindquarter, the loin.

(*b*) The less tender cuts are—

1. In the forequarter, chuck, neck, brisket, plate, shank.

2. In the hindquarter, round, flank, shank.

(2) The tender cuts are best cooked as steak, or oven-roasted by moderate dry heat in an uncovered roasting pan. A common error in cooking the tender cuts, especially when roasting, is to over-cook them at high temperature so that the meat is dry, hard, and unpalatable when served. In all oven roasts, it is advisable to place strips of suet or other raw animal fats over the top of the meat to insure self-basting while cooking. This will result in a superior roast with flavor and tenderness.

(3) The less tender cuts are best cooked by a long slow roast at moderate temperature in moist heat (the moist heat being obtained by using a covered roasting pan in the oven or on top of the stove), or by being made into stew, or ground and made into meat loaf, hamburger, etc. A long slow roast at moderate temperature in moist heat will make any meat tender. The neck, brisket, plate, shank, and flank do not make very attractive roasts and usually are ground or made into stew.

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(4) Since beef usually is issued in quarters, it frequently is impracticable to provide an organization with exactly the required quantity for a meal from the tender cuts. About 40 to 60 pounds of carcass beef (including weight of bone) are required for steak for 100 men. If an organization of 200 men received one forequarter there would not be sufficient weight of rib meat for steak for one meal, but it is satisfactory to use the more tender portions of the chuck (that nearest the rib) for additional steak meat. The same general principles apply to the hindquarter.

b. Pork.—Most pork is tender. The only cooking problem involved is to cook it thoroughly because pork sometimes is infested with trichinae. Ingestion of trichinae may result in serious illness or death. A temperature of 137° F. throughout the pork will kill all trichinae. A simple test is to see that the cooked pork is an even gray color throughout, with no pink showing.

11. Vegetables.—As a general rule, all vegetables should be cooked only enough to make them tender. This applies especially to the green leafy vegetables, such as cabbage, cauliflower, spinach, etc. Overcooking destroys the color, palatability, and health-protective value of these vegetables. Canned fruits and vegetables have been cooked at the cannery and should be heated in the mess only enough to make them warm for serving and for the proper addition of seasoning. Dry (navy) beans require long soaking and cooking at moderate temperature (at least 4 hours). Dehydrated vegetables and fruits require an overnight soak and about 4 hours cooking below the boiling point.

12. Pastry.—Pastry (pie, cake, cookies, rolls, etc.) requires a higher heat than meats and vegetables and a shorter time than meats. However, too high a heat will scorch the outside of pastry before the inside is baked.

13. Beverages.—*a. Coffee.*—The roasted and ground coffee supplied in the ration is of good quality and will make a good beverage if properly brewed. Some simple rules are—

(1) Use ground coffee only once.

(2) Use freshly boiled water. The ideal temperature for brewing is 200° to 205° F.

(3) Do not prepare coffee more than 15 minutes prior to time of serving.

(4) Never make more than enough coffee for one meal.

(5) Scour the coffee pot immediately after the completion of each meal.

b. Tea.—Hot tea is not very popular with the American soldier, but in hot weather iced tea is. To brew tea properly, fresh water

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should be brought just to a boil and then poured over the tea. Use from 1 to 3 ounces of tea per gallon of water. Brew from 5 to 8 minutes and remove the tea leaves. Tea leaves left in an infusion longer than 10 minutes will produce an increasingly bitter infusion because of the tannin in tea.

c. Cocoa.—This is a popular beverage occasionally. It may be made with sugar and water, but is much better if milk is used in lieu of part of the water. It is recommended for cold-weather suppers and to lend variety and zest to meals which are made up of left-overs and sweet-dough products.

SECTION III

FIELD MESSING; SANITATION

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14. Gasoline field range.—*a. Type and use.*—The gasoline field range, M1937, has been designed to perform a wide range of cooking operations using regular or treated gasoline as fuel. It may also be operated with wood or coal. It is a removable, portable range, capable of being expeditiously installed and operated on the ground, in an escort wagon, in a 1½-ton truck, in a trailer, on a railroad car, in a boat, and in a building. It is possible to cook while the vehicle or boat is in motion at normal speed and to transfer the range from the ground to a truck, or vice versa, without discontinuing operation. It is capable of easy handling in loading and unloading to and from vehicles without damage to the range. Food can be prepared either by roasting, boiling, baking, frying, or broiling. Facilities are provided for heating water for beverages and for cleaning individual mess and cooking equipment. The cooking equipment for each unit of the range consists of a roasting pan of sheet aluminum holding 10¾ gallons, with a heavy sheet aluminum cover which can be inverted and used as a hot plate or griddle, and a 15-gallon heavy aluminum cook pot with an 8-gallon double boiler insert which can be used as a separate cooking vessel. In addition to the above equipment, each range has a set of cooking accessories similar in purpose to those furnished with the old field range No. 1, but of better quality, and more suitable

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type. Included in this equipment are corrosion-resisting steel pancake turners, spoons, forks, ladles, and skimmers of special design. The construction of the range in small individual units makes it adaptable for use by large or small organizations and its form is such that three units can be installed across the front end of a 1½-ton Army truck facing to the rear. It is light enough to be loaded into a truck by two men. The fire unit is independent of the range body and it may be used away from the body or in one of three different positions in the body, depending upon the type of cooking being done. Balanced meals can be provided on the range for from 25 to 200 men.

b. Use on march.—(1) Since the gasoline field range is capable of cooking food while in motion accompanying troops on the march, full advantage should be taken of this so that hot food will be ready when a halt is made for meals. Meals prepared on the gasoline range with a view to serving en route should, in general, be of the easily served type.

(2) The foods selected for cooking should be of the type which can be prepared for cooking prior to commencement of the march, will require a minimum of attention en route, will not suffer from being kept hot several hours, and will be ready to serve when the halt is ordered. The following foods are good examples:

Soups.
Meat stews.
Beans, baked or boiled.
Simmered beef.
Braised beef or pork.*
Chile con carne.
Simmered bacon.
Macaroni and cheese.
Rice pudding.

(3) The following foods are examples of those which are suitable for the noon meal on the march because of ease of serving and minimum preparation. All of them can be served without cooking or with a very short period of cooking.

Bread.
Butter.
Jam.
Sliced cheese.
Pickles.
Most canned vegetables.
All canned fruits.
Canned fish.
Canned corned beef.
Meats, cooked and sliced the night before.

(4) Since coffee becomes bitter and disagreeable if made any considerable time before serving, it is best to wait until the halt before brewing it. Water can be kept hot en route, so that only a few minutes are required after halting to make the coffee.

*Beef or pork cut into pieces of about 5 pounds each and roasted by moist heat in a covered vessel with very little water.

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15. Field range, use.—The Army field range is essentially a sheet-metal box with oven, stovepipe, and a boiling plate which sets on the ground in front of the range. The cooking utensils, which include boilers, bake pans, knives, forks, spoons, etc., are designed to nest, and all can be packed inside the oven for transportation. The Army field range will give very good cooking results if carefully handled. It is made in two sizes; the No. 1 being designed to cook for 150 men and the No. 2 for 55 men. When troops equipped with the field range are on the march, mess operation must be regulated so that the field range can be loaded without delaying the march. As soon as breakfast is cooked, the cooking utensils are taken off the range and it is pulled away from the fire and disassembled to hasten cooling. The cooking vessels may be placed near the fire to keep the food hot. Usually it is not possible to prepare the noon meal on the march with the field range unless the march ends at noon; therefore menus must be arranged accordingly. If thermos cans are on hand, food can be partially cooked in the morning, transported to the place of halt, and served hot at noon after completion of the cooking.

16. Cooking outfits, pack types.—*a. Kinds.*—There are two types of pack cooking outfits; one issued to cavalry and the other to mountain artillery troops. They are designed along similar lines.

b. How used.—Cooking is done on "fire jacks," which are box-shaped, open metal racks or grates, with open ends, set over a fire. Boilers, bake pans, and other utensils are provided to rest on the fire jacks.

c. Setting up.—In order to conserve fuel and to obtain sufficient heat for all types of cooking, it is essential that a trench be dug sufficiently deep so that the top of the fire jacks when placed in the trench will be about 3 inches above the surface of the surrounding earth, which should then be banked up against the sides nearly level with the top. This, in effect, duplicates a permanent stove or range. In clay soil it is possible to round the bottom of the trench, thus permitting use of more fuel and the securing of a hotter fire. The trench should be dug parallel with the direction of the prevailing wind so that the draft is from front to rear. If the wind changes direction, an improvised windshield should be used to deflect the wind into the end of the trench and thus provide a draft. When well banked this outfit requires less fuel than the field range.

d. Quality of cooking.—While an inexperienced cook might have difficulty in turning out good meals with the pack cooking outfits, a good cook can produce meals as satisfactory as if he were provided with a permanent range. Baking of biscuits, pastry, puddings, etc., is done in an improvised oven made by covering one bake pan with

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another. In such an oven, meats can be roasted, braised, or cooked as meat loaf. Since a cover is used, the roasting is in moist heat. Dry-heat roasting cannot be done with a pack cooking outfit. Hot cakes, bacon, steak, liver, hamburger, or any other food cooked by frying can be satisfactorily fried in the bake pans. The boilers are used for meat stews, vegetables, puddings, coffee, etc.

e. Transportation.—All parts and utensils of pack cooking outfits are designed to nest so that they can be carried on a pack animal with the load evenly distributed on both sides. They can be divided into two complete cooking outfits, so that if a fairly strong detachment is required to operate away from the organization it may take cooking equipment with it. This feature is an advantage not possessed by the gasoline range or the field range.

17. Improvised fireless cooker.—When thermos cans are not available, a satisfactory fireless cooker can be improvised by using a milk can, or similar can, placed within a larger can or box, with hay or straw packed tightly between.

18. Field cooking.—*a. General.*—It is, of course, necessary that menus in the field be somewhat simpler than those served in garrison; but it is never necessary to extend simplicity to the point that troops receive a monotonous diet with stew, fried bacon, boiled beans, etc., predominating. By use of the gasoline range, field range, or pack cooking outfits, meats can be roasted, steaked, fried, braised, or made into meat loaf, hash, chop suey, chile con carne, etc. Potatoes can be boiled, fried, mashed, lyonnaised, browned, French baked, cheesed, etc. Vegetables and fruits, fresh, canned, or dried, can be served singly or in combination. The field ration provides flour, baking powder, yeast, and other ingredients sufficient to make hot biscuits, rolls, muffins, hot cakes, eggless cake, pies, cobblers, and puddings. Lack of suitable equipment or ingredients should never be accepted as an excuse for not turning out these and many other palatable dishes. A cook on duty in the field stated that he could not make pie because he had no pie tins. It was true that he did not have the conventional type of small round tin, but the black iron bake pan supplied to all troops is perfectly satisfactory for baking cobbler as well as other pastry such as cake and sweet-dough products. Fruit turnovers may also be made in the field by placing a large spoonful of cooked fruit in the center of a small circular sheet of pie dough, which is turned over and sealed together. These turnovers dropped into very hot fat brown quickly and provide a satisfactory substitute for pie, one being served to each individual.

b. Individual cooking.—With the present equipment (gasoline range, field range, thermos cans, etc.) it seldom will be necessary for most

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troops to perform individual cooking. Exceptions might occur in the case of cavalry or other troops when operating in small detachments. If it is decided to issue rations to soldiers for them to cook individually, the food issued should be the easily cooked and transported type. These include coffee, tea, cocoa, canned vegetables, rolled oats, rice, bacon, beefsteak, canned hash, ham, canned sausage, corn meal, and dehydrated soup. All of these articles are included in the field ration. Cooking is done in the individual meat can and cup over a small fire.

19. Serving meals in the field.—Food which is to be served to men in their mess kits, from the gasoline range or other field kitchen, should be systematically arranged in order to expedite service while the food is hot, and avoid spilling or wasting. In general, foods should be served in the following order: meat, vegetables, salads, dessert, bread, butter, or jam, and beverage. Men who are inexperienced or inexpert in handling the mess kit are likely to spill or waste food, therefore, it is best to fill the mess kit in the following order: meat can (bottom), cover, and cup. The meat can being deeper holds food more securely than the cover. The beverage should be served last to reduce the distance it has to be carried and thereby minimize the chances of spilling it. Where large commands are to be served, it is often well to arrange the containers of cooked food in a broken line in the open so that two lines of men may pass by the serving line, one line of men on each side of the food. If the containers are set on boxes, crates, or similar available bases, there is less distance to reach for the food, and less likelihood of spilling it. The soldier who is to serve each food or group of foods stands in a space in the serving line, facing the approaching men. He can issue his particular food (or foods) to the two lines as fast as they can conveniently pass by him. In order not to waste food, portions issued for the first helping should be of moderate size. Of course no man should be given a second helping until all have had a first helping. Food servers must be trained to estimate accurately the number of portions of a given size which may be served from the different sized kitchen containers. Servers should also be instructed to avoid spilling food, filling mess kits overfull, overturning mess kits, and unnecessarily mixing food together in the mess kits. The serving line should be located so that the men will naturally head away from the kitchen after being served; and preferably in the direction of the Lister bag (sterilizing water bag) or fresh water supply. It is best to assign a definite area in which food served in mess kits will be eaten to avoid taking it into tents or scattering it in the camp. Adequate and definite means for ready disposal of scraps of food from a meal must

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be provided. One or more garbage cans in which to dump uneaten food, peelings, etc., should be provided adjoining the messing place, together with three cans of boiling hot water. The first two of these cans should contain hot soapy water for washing the mess kit, and the third one clean hot water for scalding and rinsing it. This latter makes it unnecessary to wipe the mess kit dry, as the moisture will soon run off and evaporate if the water is hot enough. These kettles of hot water may often be arranged in line over a fire, which insures boiling hot water easily accessible. If cans are not available for garbage disposal, an open garbage pit for overnight camps (to be covered with some earth after each meal) or an incinerator or other means for burning the garbage should be provided.

20. Sanitation.—All mess personnel should be constantly alert to prevent transmission of disease through contamination of the food

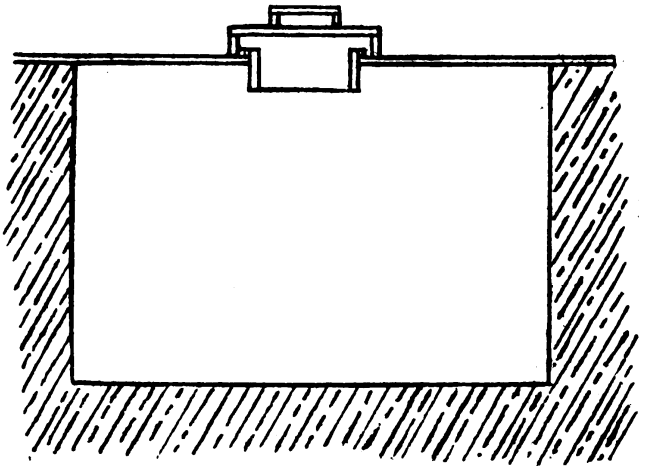

FIGURE 1.—Pit for slops.

served to troops. All food handlers should receive the prescribed examination by a medical officer. Personal cleanliness should be rigidly enforced. All food should be kept covered and protected in every way possible from flies and other vermin. All utensils should be thoroughly cleaned and kept clean when not in use. There is no better germicide for mess purposes than hot water and soap. Utensils should be exposed to the sun as much as possible.

21. Garbage.—*a. Source.*—Garbage should accumulate only from uneaten food on the men's mess kits or plates and unavoidable kitchen waste. Both of these sources should be held to a minimum. Food left on serving platters, in cooking utensils, etc., should be carefully conserved. No edible food should ever go into the garbage if it can possibly be avoided.

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b. Disposal.—(1) Whenever facilities are not provided for disposing of the kitchen waste, it becomes necessary to dig a slop pit. Open slop pits should be avoided as they attract flies and spread infection. It is necessary, in a camp of other than temporary duration, to strain all dishwater and liquid garbage through a box sieve suitably placed over a pit and burn all solid matter in the range or incinerator. To

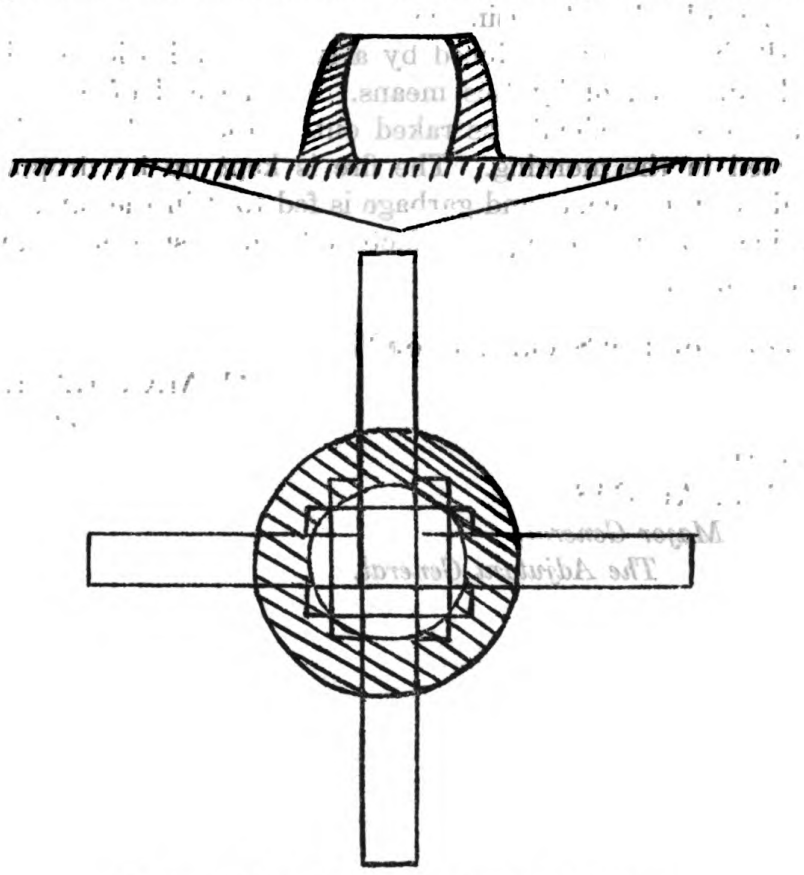

FIGURE 2.—Plan and cross section of company incinerator.

darken the pit and keep it free from flies, make a board top, tamp edges with dirt, and provide a detachable box sieve with cover (Fig. 1). The pit should generally be about 2½ feet wide, 5 feet long, and 4 feet deep when dug in clay, and should be filled about half full with large rocks. In more permeable soil the dimensions may be somewhat reduced.

(2) To build a company incinerator, dig two trenches 10 feet long and 10 or 12 inches wide, bisecting each other. At the point of bisection have the trenches 30 inches deep, gradually shallowing from this point to the ends. Fill with rocks until about 18 inches deep at center. Over the place of bisection place four boards to support an ordinary sugar or flour barrel. Around the barrel pile sods of earth

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packed tightly up to the top. Make a fire in the trench under the barrel, which, upon being burned out, leaves a hard cone. According to the direction of the wind, leave one trench open and plug the other three openings near the cone with boards, turf, or loose soil. This gives a draft of air through the open trench and up through the cone, which acts as a flue. If the soil is full of clay the cone is easily made. If not, it can be done by using sods.

(3) All the garbage produced by a large organization kitchen can be easily disposed of by this means. At the end of each day the ashes and tin cans should be raked out of the fireplace and a fresh fire started in the morning. The fire is kept up by dropping fuel material down the cone, and garbage is fed to it in the same manner. The incinerator is also very satisfactory for disposing of waste water.

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BY ORDER OF THE SECRETARY OF WAR:

G. C. MARSHALL,
Chief of Staff.

OFFICIAL:

E. S. ADAMS,
Major General,
The Adjutant General.

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